31st Annual Meeting of the DPS, October 1999
Session 78. Io: Neutral Atmosphere, Ionosphere, Magnetospheric Interactions, and Plasma Torus
Contributed Oral Parallel Session, Friday, October 15, 1999, 4:00-5:30pm, Sala Pietro d'Abano

[Previous] | [Session 78] | [Next]

[78.08] Application of Computerized Tomography to the Study of the Interaction of the Ionospheres of Io and Europa with Jupiter's Magnetosphere

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The Galileo orbiter has provided radio occultation measurements of the electron density profiles of the plasma surrounding Io and Europa. There have been six occultations of Io, providing twelve electron density profiles at various locations relative to the ram direction of the impinging particles of the Jupiter magnetosphere on Io, and eight profiles on Europa.The technique of computerized tomography was applied to obtain the distribution of plasma around these satellites without recourse to the assumption of spherical symmetry. The two satellites were found to have very different plasma environments, with Io having a proper ionosphere produced on top of an endogenous SO_2 atmosphere by magnetospheric particle precipitation and solar EUV, while Europa has a tenuous plasma environment produced by the same mechanisms from an oxygen atmosphere itself also produced by sputtering of water ice from its surface by impinging magnetospheric particles. In both cases the observed electron density profiles are highly asymmetrical, with a compressed profile on the ram side, and an extended one on the wake side. The presence of several measurements for each satellite at different ram-to-wake directions provided data for estimating an approximate distribution of ionization from the ram direction to the wake direction.

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[Previous] | [Session 78] | [Next]